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THE KAHORSHO SITE (NA10,937)

COCONINO NATIONAL FOREST, ARIZONA

AN INTERIM REPORT

By

WILLIAM J. BEESON  
and  
HOWARD P. GOLDFRIED

June 1976

# ARCHEOLOGICAL REPORT



USDA FOREST SERVICE  
SOUTHWESTERN REGION  
ALBUQUERQUE, N.M.

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The Kahorsho Site (NA10, 937), Coconino National Forest, Arizona.

1976

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THE KAHORSHO SITE (NA10,937)  
COCONINO NATIONAL FOREST, ARIZONA  
AN INTERIM REPORT

By  
WILLIAM J. BEESON  
and  
HOWARD P. GOLDFRIED

Report No. 12

USDA FOREST SERVICE  
Southwestern Region  
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## CHAPTER I

### INTRODUCTION

Archeological investigations at NA10,937 (Kahorsho Site), located in the Elden District of the Coconino National Forest (T22N, R8E, Sec. 35, SE 1/4 of SE 1/4), were carried out under the Museum of Northern Arizona's permit from the United States Department of Agriculture. We wish to thank the personnel of the Museum of Northern Arizona for their aid and assistance in all of the necessary administrative requirements. We also want to recognize the excellent cooperation and encouragement of Mr. Peter Pilles of the Coconino National Forest.

The field excavations were under the direction of William J. Beeson and Howard P. Goldfried, Professors of Anthropology at California State University, Sacramento. President James G. Bond of C.S.U.S. went to great effort to secure the necessary field equipment to assure the success of this project. The Museum of Northern Arizona provided one full-time field archeologist for most of the field session in the Summer of 1974 and two full-time assistants from their Summer Assistant program in the Summer of 1975. Twenty-five students participated in the 1974 excavations and twenty-one took part in the 1975 excavation. Mrs. Jeanette Goldfried served as coordinator for all laboratory work during both seasons. A group of seventeen teachers, part of a National Science Foundation teacher training project under the direction of Dr. John H. Chilcott of the University of Arizona, spent three days excavating at the site. Dr. Chilcott supervised their operations, turning over all notes and other materials when done.

All recording of archeological data conforms to the systems employed by the Museum of Northern Arizona. All notes, artifacts and other materials from our investigations will be permanently available through the Museum of Northern Arizona.

The field sessions lasted between July 19 and August 9, 1974, and between June 2 and July 25, 1975. During those sessions most of the usual excavation, mapping and other site related activities and preliminary laboratory work were done. Specimens were washed and prepared for cataloging while in the field. A

portion of the cataloging was done there but the vast majority of such work was completed by students in the archeology laboratory at California State University, Sacramento, with excellent coordination by John and Connie Madsen. Students were also involved in analysis and synthesis problems (as they have been possible and profitable with the limited data now at hand) at that University. Several portions of this report are only possible with their help.

The excavation to date includes: three surface rooms, seven subsurface rooms, fourteen pits in our grid system, eleven pits in the mound area, approximately one-half of the large depression to the south, southwest of the site and testing through a cinder mound to the west of the site. Six activity areas outside of rooms have been examined, two completely. Many features remain to be investigated, so a return to the site is mandatory for a meaningful final report.

Map 1 locates the site generally within the modern cultural context. All of the excavated areas mentioned above may be seen on Map 2, the only map in this report to show the full extent of the site.

This site was chosen in part, because it is on land which was being considered for a land exchange program by the Coconino National Forest. By excavating this particular site we could pursue archeological research design goals while aiding in the resolution of a problem of concern to a federal agency.

The site's earliest dates are from the first decades after the eruption of Sunset Crater. This was determined at the time of our first surface examination, and field results indicate that it is essentially true except that the duration of occupancy was actually longer than we first anticipated, lasting until nearly A.D. 1300. The specific period of occupancy was important as the following report demonstrates.

The site is small enough to be tested within a reasonable amount of time (five years maximum) and appears to be relatively typical in size, location, and attributes of many sites in this



region for the time period it was occupied. It must be pointed out, however, that the area has not been thoroughly surveyed, and certainly it has not been sampled adequately. Such work is desperately needed, and is being done as funds become available.

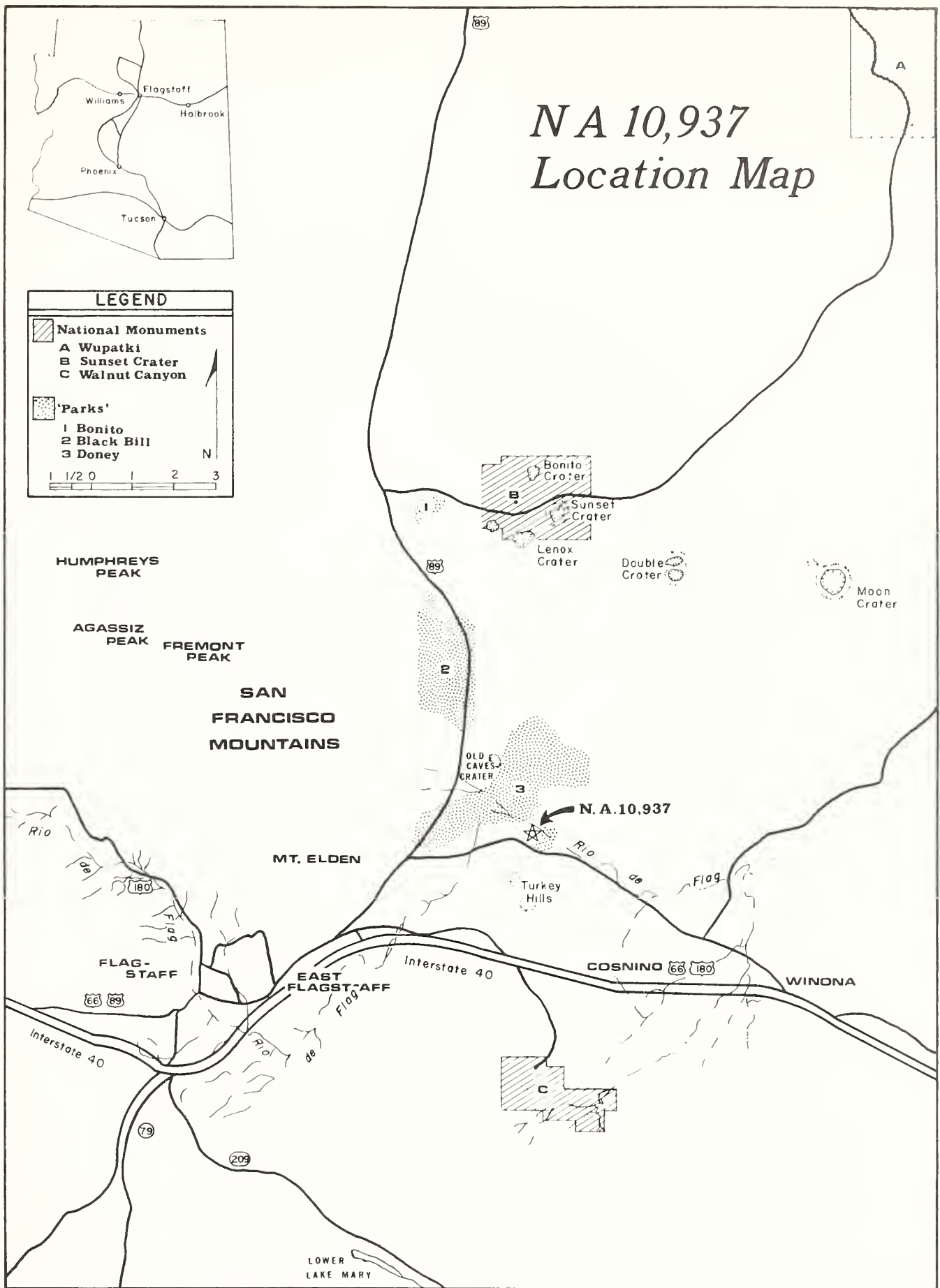
In their dissertations, Kelly (1971) and Wilson (1969) summarized extant knowledge of the Sinagua culture. While our research does not yet allow a new contribution to their definitions, it does permit an assessment of this site as Sinagua in that: 1) Alameda Brown Ware is present; 2) the site is within the cinder fall zone of Sunset Crater; 3) the site lacks readily identifiable ceremonial structures; and 4) there is a lack of a developed local decorated pottery tradition.

The Turkey Hill locality, the geographic area which includes NA10,937 (for a definition see Kelly 1971:31), was intensively occupied by the Sinagua from about A.D. 1066 (eruption of Sunset Crater) to approximately A.D. 1300. Excavations in this area include the Piper Site (Bliss and Ezell 1956), Picture Canyon (Colton 1946:50-51), Turkey Hill Pueblo (Colton 1946:72-74), New Caves Pueblo (Colton 1946:66-67), Old Caves Pueblo (Colton 1946:37-38), Elden Pueblo (Kelly 1971) and Cinder Hill Village (Pilles n.d.). Reports from the most recent excavations in this area are not yet available and are not incorporated in any discussion in this text.

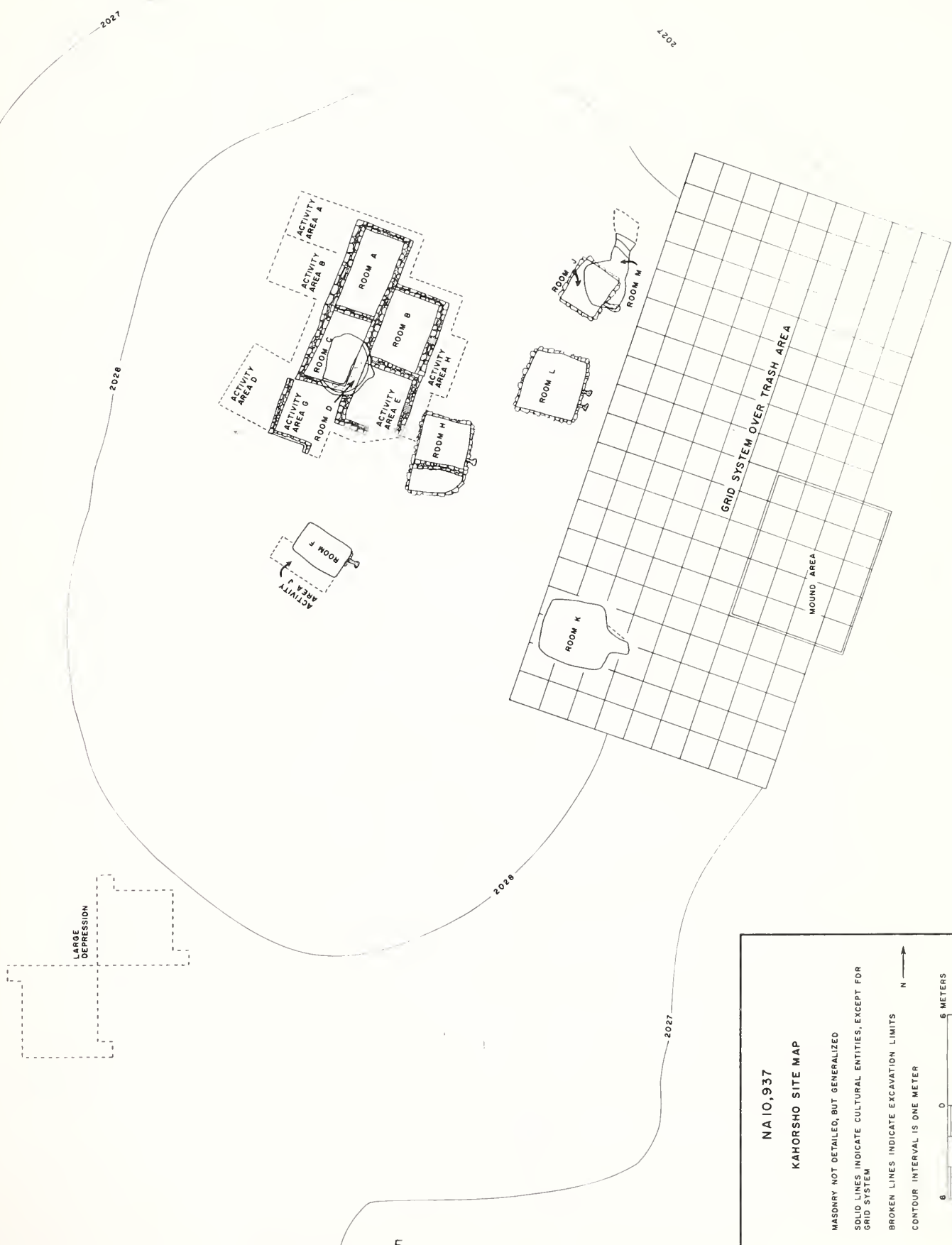
The site was officially recorded by personnel of the Museum of Northern Arizona as part of their survey work for the Coconino National Forest on lands considered for an exchange program, but Emil W. Haury gave us a verbal statement that the site was known to him and to Byron Cummings during their work at Turkey Hill Pueblo. It was thought by them to be simply an outlier for the larger Turkey Hill Pueblo site.

No evidences of serious prior disturbance were noted on the surface of the site when it was originally surveyed, but disturbances had been made in several places as noted in the field later, and reported in this text.









NA 10,937

KAHORSHO SITE MAP

MASONRY NOT DETAILED, BUT GENERALIZED  
 SOLID LINES INDICATE CULTURAL ENTITIES, EXCEPT FOR  
 GRID SYSTEM  
 BROKEN LINES INDICATE EXCAVATION LIMITS  
 CONTOUR INTERVAL IS ONE METER





## RESEARCH DESIGN

Roger E. Kelly, in his study of the twelfth and thirteenth century Sinagua, states, "conditions during those first few decades after the eruption of Sunset Crater were apparently optimum for the Sinagua and continuance of status quo was all that was necessary" (Kelly 1971:120). Kelly's study of thirteenth century Sinagua had shown that instability as a result of stress led to abandonment of the Flagstaff area, although specific abandonment varied by region (Kelly 1971).

It seemed that his statement would be an appropriate basis for an hypothesis to investigate Sinagua stability during the decades in the twelfth century soon after the eruption of Sunset Crater. If, in fact, this area had experienced a land rush participated in by people of diverse cultural backgrounds; this could in itself create stressful conditions. Assuming stress was a persistent characteristic in the Sinagua culture after the eruption of Sunset Crater, we formulated this hypothesis:

Instability as a result of stress characterized the first few decades after the eruption of Sunset Crater.

Kelly's thesis is that environmentally caused stress occurred in the thirteenth century as a result of worsened environmental conditions. We have been concerned that this may only be a late and specialized stress which ultimately resulted in the abandonment of the entire area. We expect to find evidences of stress earlier than Kelly defined them, possibly not environmentally caused. For example, in hypothesis 9 in the following list, stratification may be associable with stress but not as a result of regulating the use of area resources.

We developed, using Kelly's model, a series of hypotheses to be field tested. Our data are, therefore, expected to be useful in the confirmation, denial or alteration of the following hypotheses (each should be prefaced by the statement: The Sinagua, in the first decades following the eruption of Sunset Crater,):

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1. emphasized food procurement subsystems, especially hunting and gathering,
2. broadened, but made shallower, procurement activities,
3. experimented with shelter types to be more efficient for a less sedentary mode of life,
4. experimented with shelter types to be more efficient for the centralization of larger social and economic cooperative groups,
5. lost less productive members of society through death, warfare, or disability,
6. had lowered resistance to various organic ailments,
7. structured access to necessary resources;

and to contribute to confirmation, denial or alteration of the hypotheses that the Sinagua on a more general level:

8. abandoned certain marginally productive areas and shifted their population centers to more productive ones, and
9. used social regulatory subsystems such as stratification to foster exclusive use of area resources by some segment of the population within the area.

These hypotheses are general, they do not require the selection of one particular site for excavation to contribute to the confirmation, denial or alteration of them. Since questions of stress generally underly most of the Sinagua interpretations in the literature, we must be explicit in thanking Kelly for his formulation of them and we have used or paraphrased certain of his original statements (Kelly 1971:15-22).

The site was stratified for purposes of sampling. The sub-universes are: Rooms, surface and sub-surface; depression to the southwest of the rooms; mound to the east of the rooms; areas in the immediate vicinity of the rooms; and trash deposits as discernible from surface detritus. The sub-universe of rooms has been the most thoroughly investigated to date. A grid system was established for the eastern side of the site in order to immediately accommodate Dr. Chilcott's group in the first field



season. This was treated as a single sub-universe for sampling, with reliance on the extreme concentration of trash for its definition. Map 2 shows these features.

The original research design is still satisfactory. It has been discovered that the ceramic dating of the site indicates an occupation which lasted longer than originally thought, but the questions asked are not fundamentally changed as a result of this discovery. Activities have been expanded in the immediate vicinity of the site so that more interesting things may be done to elaborate the design, including a search for prehistoric local resources such as quarries and fields.

There are comments in the text, where appropriate, on the results of our work thus far. Since we have concentrated in the architectural areas and we have not completed analyses of important portions of our data this interim report is necessarily incomplete. We realize this and expect to deal with these limitations in our final report.

#### ENVIRONMENT

NA10,937 is located in an area of numerous cinder hills to the east of Elden Mountain, where the elevation of relatively level ground is between two thousand and twenty one hundred meters. The cinder hills often rise over twenty two hundred meters. Many of these cinder hills, such as Turkey Hill, O'Neal (New Caves Hill) and Doney (Old Caves Hill), are important to the archeological literature of the area. Plate 1,c, shows the distant Turkey Hill cinder cone which lies to the south of the site. There are open areas between these hills which are sometimes relatively large expanses of treeless land, e.g., Doney Park (in the foreground of Plate 1,c), and which exhibit mixed floral associations. In fact, there are pockets of mixed plants in many places through the Turkey Hill locality. Prominent plants include ponderosa pine, juniper, pinyon, oak, grasses, many shrubs and prickly pear and hedgehog cacti. Plate 1, d , is a view through the ponderosa pine forest from the site to the San Francisco Peaks, and Plate 1, b, shows mixed vegetation to the west of the site.

Snow and rain occur from December through March, rain occurs from July to late August, the remaining months are relatively dry. Harold S. Colton (1958) reported a growing season of one hundred twenty five to one hundred fifty days and a total annual rainfall of slightly over sixteen inches.

The numerous rock outcroppings within the Turkey Hill locality are volcanic in origin. The nearest non-volcanic rock is to the southwest along the Rio de Flag and directly south in Walnut Canyon.

In the immediate area of the site there are several pits with depths up to ten meters. These were reportedly dug by the United States Forest Service, but we do not have direct reports of their origin. They are recent. They show both thick and deep cinder beds which are overlain by a soil which is derived from volcanic deposits. The soil is not uniform in color or in consistency. There is a discontinuous deposit of black ash over these surface soils from the eruption of Sunset Crater, as on almost all land surface in the neighborhood of this site. Ash can be seen in the foreground of Plate 1,b, with abundant sherds on it. There are shallow sheet deposits of a few meters in diameter and dune-like deposits of much larger size which have resulted from windblown deposition from surrounding surfaces. Later in the text is a commentary on the cross-sectioning of such a dune, and its being the result of wind action in a late period is open to question. The sherds noted above on the ash have no explanation or hypothesis offered for their association with it. Hopefully, enough field data will be gathered in the future to offer one.

NA10,937 is near the boundary between a predominantly ponderosa pine forest and an almost complete break to pinyon pine and juniper forest to the east. The latter trees comprise an important part of the plant community in the immediate vicinity of this site. This variation in plant availability, which includes acorns and pinyon nuts as products which are usable food sources, may be important in the understanding of this particular occupancy. Hypothesis number 1 and Hypothesis number 2 that we have accepted





a. Original appearance, surt. rooms.



b. Cinders and vegetation, to west.



c. Across Doney Part to Turkey Hill.

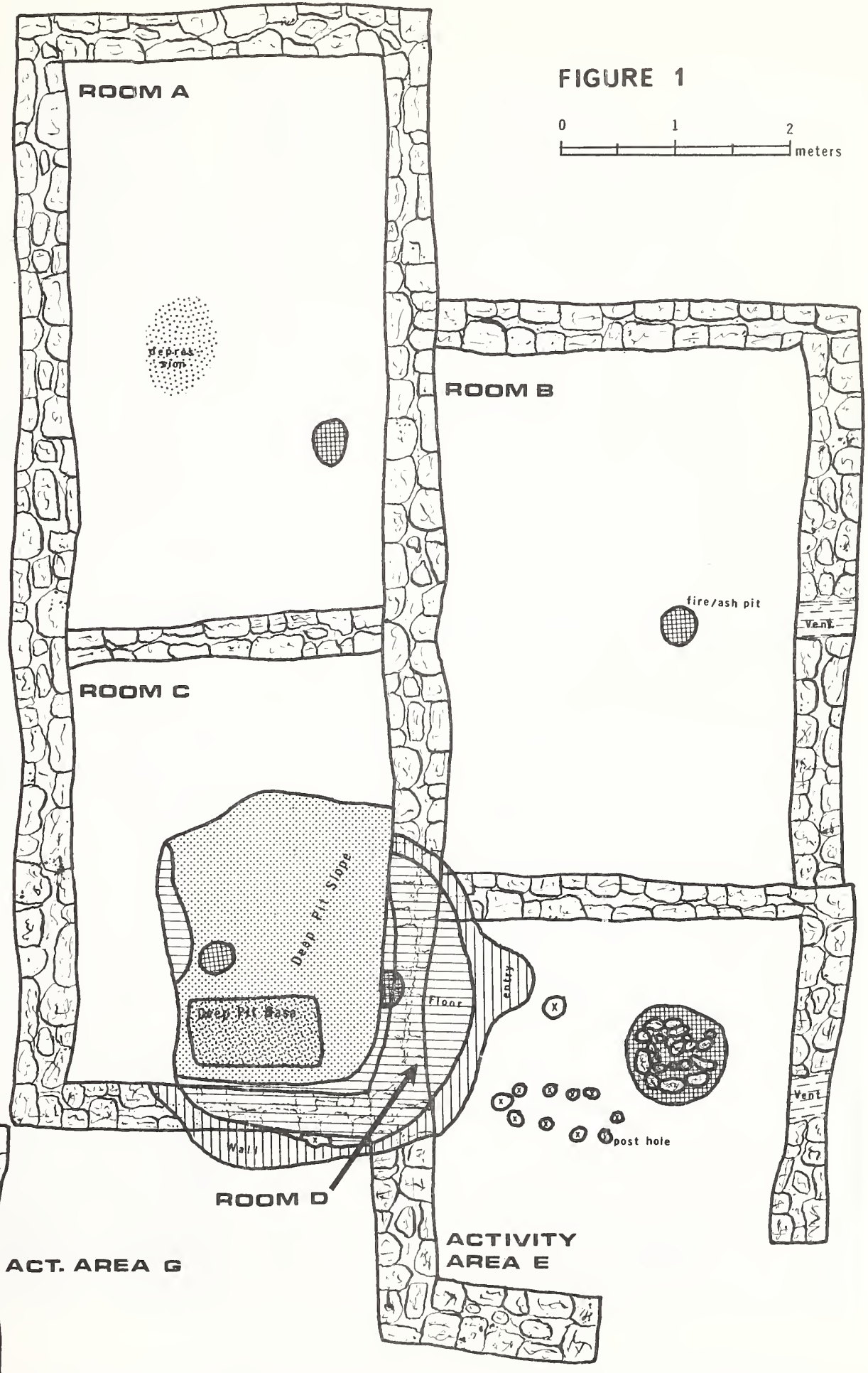
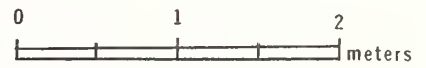


d. West to San Francisco Peaks.

for testing may be partially understood through the location of the site itself. Accessibility of these gathered foodstuffs could have been an important factor, one which indicates a broadening of procurement activities and by the food procurement subsystem of gathering. We are unprepared, at this time, to go further with this idea since we do not even know plant distribution at the time of site occupancy, much less the dependence such a population could place on such foods nor even the food value.



FIGURE 1









a. East wall of Room B, note vent opening.



b. East wall of Room A, and outside west wall.



c. North wall of Room A.



d. Surface rooms being excavated.





## CHAPTER II

### SURFACE ROOMS

Three rooms were built on or near original ground surface levels. These rooms, designated Rooms A, B and C, were recognized in the original survey. Additional walls to be discussed later, exist in conjunction with these rooms. Figure 1 shows these rooms and parts of the additional walls. Prior to excavation, the appearance of this area of surface rooms was a slight mound with rocks indicating the approximate locations of walls; see Plate 1,a.

The excavation procedure followed in all surface rooms was to divide them into quarters, and the opposite quarters (north-west with southeast, etc.) were excavated to just above the floor level. The procedure may be seen in Plate 2,d. This made possible complete cross-sections of the fill in two directions. The purpose was to identify any meaningful patterns of room fill and to isolate natural layers for removing the contents of the remaining quarters. No significant details were discovered in these cross-sections. The fill of the surface rooms was relatively homogeneous.

Upon completion of the first pair of quarters, the remaining pair was excavated so that the room was completely excavated to the floor. After the floor and walls had been mapped and photographed, along with any features in them, all floor areas were penetrated sufficiently to insure that any subfloor features would be found. The final process in each room was to cut through walls to determine wall construction techniques. Then the rooms were back-filled with the rubble and dirt which had come from them.

Some walls did not enclose rooms, and these were followed sufficiently to recognize all wall junctions in the immediate vicinity of the surface rooms. We excavated around the outside of all this area to determine its full extent, as is evident in Plate 2,d. Further examinations of the areas outside the identifiable rooms are planned for forthcoming field sessions.

Certain field techniques were persistently followed, including screening the fill materials to remove cultural debris over one-eighth inch mesh hardware cloth. Samples of fill materials were kept for analyses of various kinds. These samples were arbitrarily selected since there were no natural levels (other than clay) or other formations in the room fill to indicate particular depths for collection. Collections were made at varying depths from both the fill and the floors, and their context noted.

The fact that the walls of the room were not completely identifiable from the unexcavated surface, plus the fact that the rooms were not perfectly square, led to the limitation that collections by quartering the rooms are not absolutely comparable by volume. This is true both intrastructurally and interstructurally. However, these collections are not so skewed as to be unusable.

#### Room A

Room A (see figure 1) was the northernmost surface room. An examination of the outside of its walls to the north, west and northeast led to the conclusion that no further construction in mortar and stone extends in those directions. Old surfaces were not pursued enough to search for post holes or other evidences of perishable structures. We will return to complete that at a future time.

Rooms A and C constitute the original surface construction effort at the site. Since the wall which makes them contiguous rooms abuts the other walls, this may have been used as one large room originally. No confirmation or denial was possible.

The fill of Room A contained a large quantity of hard or semi-hard clay. The clay does not appear to be wall, per se. As in all the rooms, the deposits of clay began at depths of ca. forty centimeters below the present ground surface in small quantities and became maximally concentrated at about sixty centimeters. The clay was not only more dense than other fill but it was colored in the yellowish ranges. The yellow color made it distinguishable from the reddish clay which was below the floor

in these structures. When the walls were cross-sectioned in Room A it was found that the yellowish clay was confined to the interior of the room. This may mean it was only used as roof material; but the nature of the wall bonding materials is not known and this clay accumulation may be the result of weathering of such wall bonding materials. No plastered floor was found in Room A, but the floor level was located through color changes, the generally packed consistency of the ground, and the level of the firepit and depression.

The firepit was rounded, excavated in a general bowl shape and solidified as a result of concentrated burning with no clear evidence of a manufactured clay lining. Naturally occurring rocks were associated with it.

The widths of walls were, as in all the surface rooms, in the sixty centimeter range. There were irregularities in all wall widths so that wall width varied from forty centimeters to seventy centimeters. While flat surfaces of rocks were oriented toward the interior of rooms, minimal effort went into the selection of rock for building and those used in the walls tended to be irregular in shape and size. The walls were located by seeking relatively broad planes of cleavage between them and the interior fill. The walls also varied in the proportions of stone and mortar used. Plate 2, b and c, show the east and south walls respectively of Room A. In the illustrations for figures we have not drawn the exact location or shape of rocks, but we have simply used rock sketches to show the location of masonry.

Part of the wall on the north of Room A was removed for examination. Sherds were found within the wall, but they do not appear to have been used as chinking; rather, they appear to have been in the materials used as mortar.

The fill of Room A was studied for information about room collapse, and no conclusion is immediately possible nor appears likely.

There was a tremendous quantity of cultural material in the fill of Room A. The abundance was so great as to suggest

that this room was abandoned earlier than other nearby areas, and became a trash depository. This room was probably partially open and used by nearby residents as a place for mundane activities, possibly children at play. This is suggested by the occurrence of several miniature vessels and small figures in the fill of it. There was no pattern to the location of these artifacts. It is also possible that these items were left on a roof, and its collapse after partial room filling could account for their location in the fill.

#### Room B

The evidence, from a study of wall abutments, is that Room B was the last one built in the surface complex. It is impossible to be certain of the relationship (in time) of the south wall of this room to the remainder of it. The north and east walls of this room form an L which was built as a single unit. The south wall forms an L with an extension which goes further to the south, ending outside the room. Figure 1 shows these wall relationships.

The floor was made of compacted material overlying the usual reddish clay of the culturally sterile level under the rooms, and yellow colored clay was used to plaster walls. The fill was similar to that in Room A, except that the quantity of cultural debris was much less.

The firepit was, again, a rounded and bowl-shaped pit with no definable lining of clay or rock. It was a well-defined feature, probably as the result of much burning in it.

There was an opening through the east wall of this room which led from the floor level of the room to the outside ground surface. Plate 2, a, shows this wall and the opening through it. Excavation showed that this was not an interior wall niche. It did have a lining on top, sides and bottom. Its purpose is unknown, although it was field designated a "ventilator." It was possible to identify the exterior of the wall through which it was cut but enough outside work has not been done to resolve questions about its original use. It is possible that this was a drain or other such architectural feature.

A broken pot and several manos were found just above the floor. Their positioning in the fill suggests original roof locations.

### Room C

This structure was more complex than the others. The complexity resulted from this room being partially built over some type of deeper excavated area, including an earlier small room (see Figure 1).

Room C had plaster on its walls, and there was also a floor plaster found. Most of the floor was, as elsewhere, identified by the level of the firepit (it is directly over the deep pit in Figure 1) and the contact between fill and reddish clays. In the area above Room D (see subsurface room section) and the deep pit reported below were several hard levels, none of which was complete and any one of which could have been a floor. A second, minor pit in the floor was associated with burning.

The general fill of Room C was essentially the same as in the other surface rooms, as were the walls.

One problem in the excavation of this room was the fact that it involved two field seasons and two different sets of excavators which produced serious problems with continuity. During the second season a pit of about three meters in depth and two meters across, essentially square, was found. Its south wall was almost vertical and its north wall sloped (see Figure 1). The shape of it, however, was such that it resembled a mine shaft. Museum of Northern Arizona personnel first suggested it could have been dug by a Mr. Ben Doney who "had heard a legend about a Spanish mine at a red hill near a blue mountain. He spent his life digging the bottoms out of Indian pit houses, thinking them to be openings to old mine shafts" (Granger 1960:68).

The following statements are basic to establishing the relationships between Room C, Room D and the deep pit:

1. There was no complete floor over it at the level of Room C or at the level of the underlying sub-



surface room, Room D. In fact, no floors were found in it - only a packed layer of dirt at the bottom of the pit.

2. A single sherd of Jeddito Black-on-yellow occurred in the fill of the pit below the level of Room C, but not sealed off by the floor.
3. The firepits (or ash and firepit) of Room C were definitely within the area of this pit and at the level of Room C floor.
4. Remnants of clay occurred between the floor levels of Room C and Room D. The clay appeared to be essentially the same as that of the wall of Room D.
5. One crushed pot was in the fill slightly below the floor level of Room C, and two complete pots were near the bottom of the pit. Other artifacts, usually desirable to a collector, occurred in the fill of this pit.
6. Finally, and importantly, the excavators during both field seasons did discover relatively minute and obscure patches of floor materials, convincing evidence that they did know what to look for and the floors were actually missing.

While a complete analysis and synthesis remain to be done, some tentative conclusions are possible regarding this pit:

1. It is unlikely this pit was dug by Mr. Doney as it was refilled strangely for someone who was seeking artifacts. This explanation is not acceptable at this time.
2. The firepit(s) for Room C is (are) directly associated with the fill of this pit, so Room C appears likely to have been occupied after the pit had been dug and refilled.
3. The pit appears to have been dug through Room D, destroying whatever was within its bounds at that time.

4. The walls of Room C closely follow those of Room D and are built from the level of the Room D floor. The pit was oriented squarely with the walls of Room C. These two facts suggest that the deep pit was not dug until after the walls of Room C were built.

The sequence appears to be: the construction and abandonment of Room D, the construction of the walls of Room C and perhaps some occupation of it, the digging of the large pit, the filling of the pit; finally, an occupation surface at the higher level of Room C. The presence of the very late sherd in the fill of the pit, below the level of Room C, is not explained.

#### SURFACE ROOM SUMMARY

The supporting evidence for these summary statements, while recognized as necessary, is not wholly included in this interim report.

- 1) The surface rooms contained no post holes, burials, storage pits or other subfloor constructions or excavations interpretable as integral parts of these rooms, with the sole exceptions of the fire or ash pits. The Room A floor depression was sufficiently shallow as to have been an irregularity in the floor itself (fifteen centimeters maximum), perhaps a base for a ladder from a roof entrance. The pit through Room C was an anomaly.

- 2) Nothing was found in any of the surface rooms which was useful for absolute dating of the structures.

- 3) The only relatively unique architectural feature was the opening through the wall in Room B.

- 4) None of the surface rooms was demonstrably different from the others in function. Their features and size were similar.

- 5) No evidence was found that yielded detailed information on the patterns of room collapse or fill.

- 6) Nothing can be stated at present as to the relationships between these rooms and other features at the site, except that Room C overlies Room D.

- 7) There was a concentration of cultural material in the southwest corners of these rooms. This concentration of materials was the same through the fill, not at just one level.

8) Both floors and walls are plastered, although absolute evidence was sparse in Room A.

9) Walls were uneven in that there was variable sized and shaped rock used with abundant mortar. Note Plate 2 for examples.

10) The quantity of rock in the fill leads to the suggestion that the walls reached a height of two, to two and one-half meters. The rocks were not actually piled on walls for this determination.

11) There was no evidence of doors or windows through walls. The only wall penetration was in Room B. Roof openings appear likely for entry.

12) Rooms appear to have been stripped of their contents upon abandonment. No determination was made if this also included items on roofs. This suggests that abandonment was not done in haste.

13) All three rooms had considerable detritus in their fill along with considerable quantities of artifacts, both whole and broken. It is felt that the quantity of artifactual remains is too great to be explained as materials used in wall and roof mortar or other coverings.

14) Room A contained greater quantities of materials than the other rooms. It may have been abandoned before immediately adjacent rooms. It also contained complete miniature pots and other items (figurines) which may have been the result of children using the area after it was abandoned and partially filled. It is therefore likely that there was a gradual abandonment of the site rather than a sudden abandonment.

15) These structures were singularly plain. They consisted of walls, floor, firepit, and literally nothing else of major significance as Figure 1 illustrates.

16) The surface rooms we have excavated appear to have been used for habitation.

17) Finally, we can state that our research design hypotheses are affected by the data from these surface rooms only in that homogeneity indicates a lack of experimentation. It is possible the abandonment of this site was affected by marginal production of foodstuffs, but the abandonment does not appear to have been



hurried. These shelters are certainly substantial, and indicate a sedentary mode of life from that and from the fact they appear to have been habitations. Since Room A does appear to have been deserted earlier than some other part of the site we have the feeling at this time that the population drifted away relatively slowly.

#### SUBSURFACE ROOMS

Seven subsurface rooms have been excavated at NA10,937. These were designated Rooms D, F, H, J, K, L and M (the gaps in room designations are due to the assignment of letters to obvious rooms which have not yet been excavated).

Different excavation techniques were used in these rooms. Rooms F, J, and L were excavated by the procedures employed in the surface rooms. Rooms H and K were excavated with pedestals left for cross-sections due to the special nature of those two rooms and the initial procedures necessary to locate their walls. Room D was under Room C, and Room M was under Room J so that the excavation of Rooms D and M was dictated by the situation of their discovery.

The rooms were excavated completely. All the subsurface rooms are physically separate from the surface rooms and from each other, although the distances between them are not great. Rooms D and M are obviously earlier than other rooms at the site from their stratigraphic positioning. Room K also appears, from the evidence analyzed, to be early.

#### Room D

During the excavation of Room C, in 1974, it became apparent that some kind of floor remnant was present in the walls of the ever-growing deep pit in the south of the room. These fragments were left in place and the area returned to in 1975. As the deep pit was excavated it became increasingly evident there had been a room across the pit at an upper level; and, in fact, the walls of Room C actually were constructed in the depression left from the earlier structure, resting almost on the floor of Room D. Figure 1

shows these relationships and the illustrative support for the following room description.

Areas were opened around the possible extent of Room D. The room had been small, about three meters in diameter, essentially round, and almost entirely within the space defined as the south part of Room C, including its walls. Room D had a firepit in the east part of it, a clay floor which continued up the base of the earthen walls (they had no rock in them), and an entryway represented by fragments which sloped upward toward the east. A post had been set into the edge of the south wall. This was the only indication of roof support. No other features were found although they were sought.

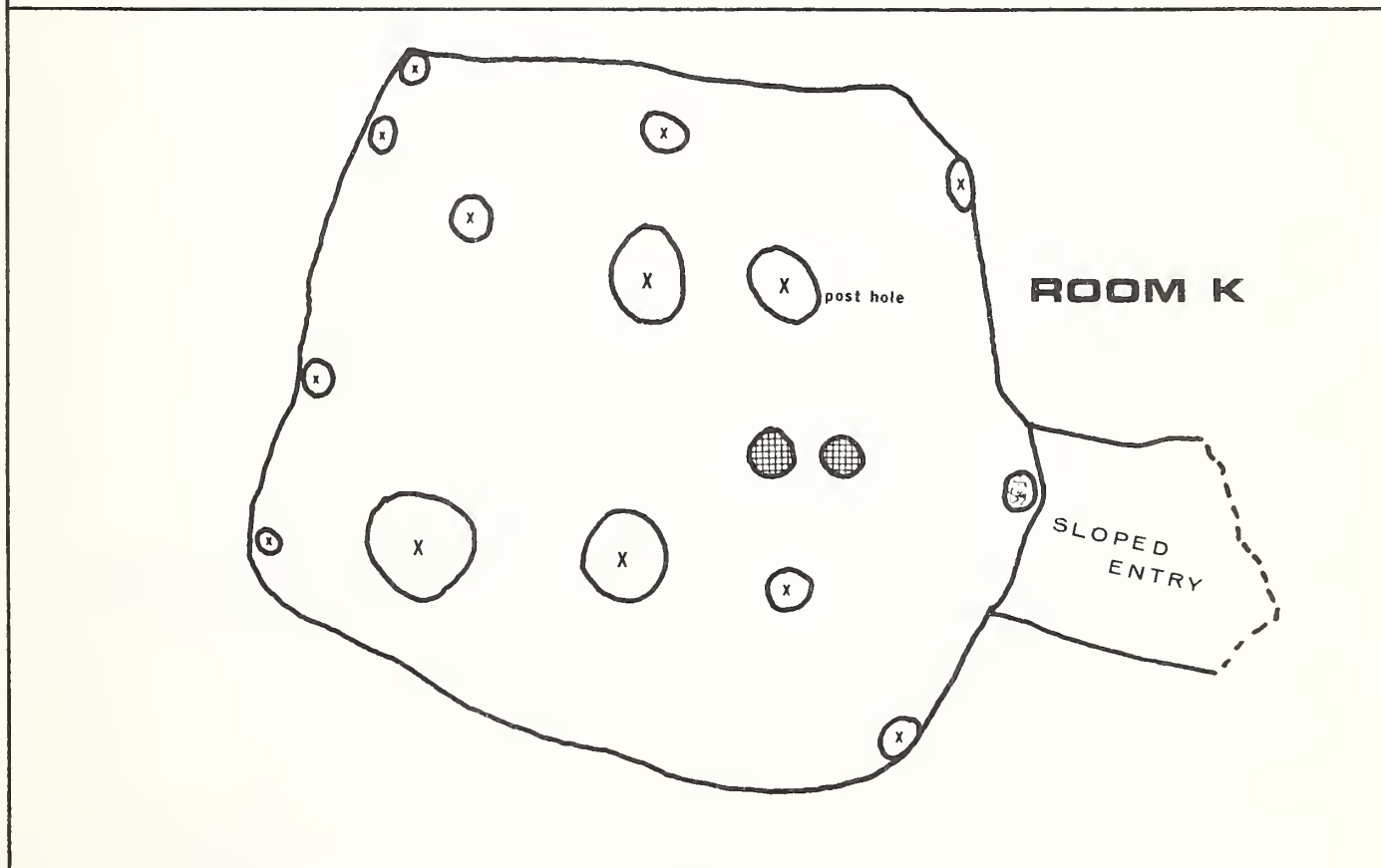
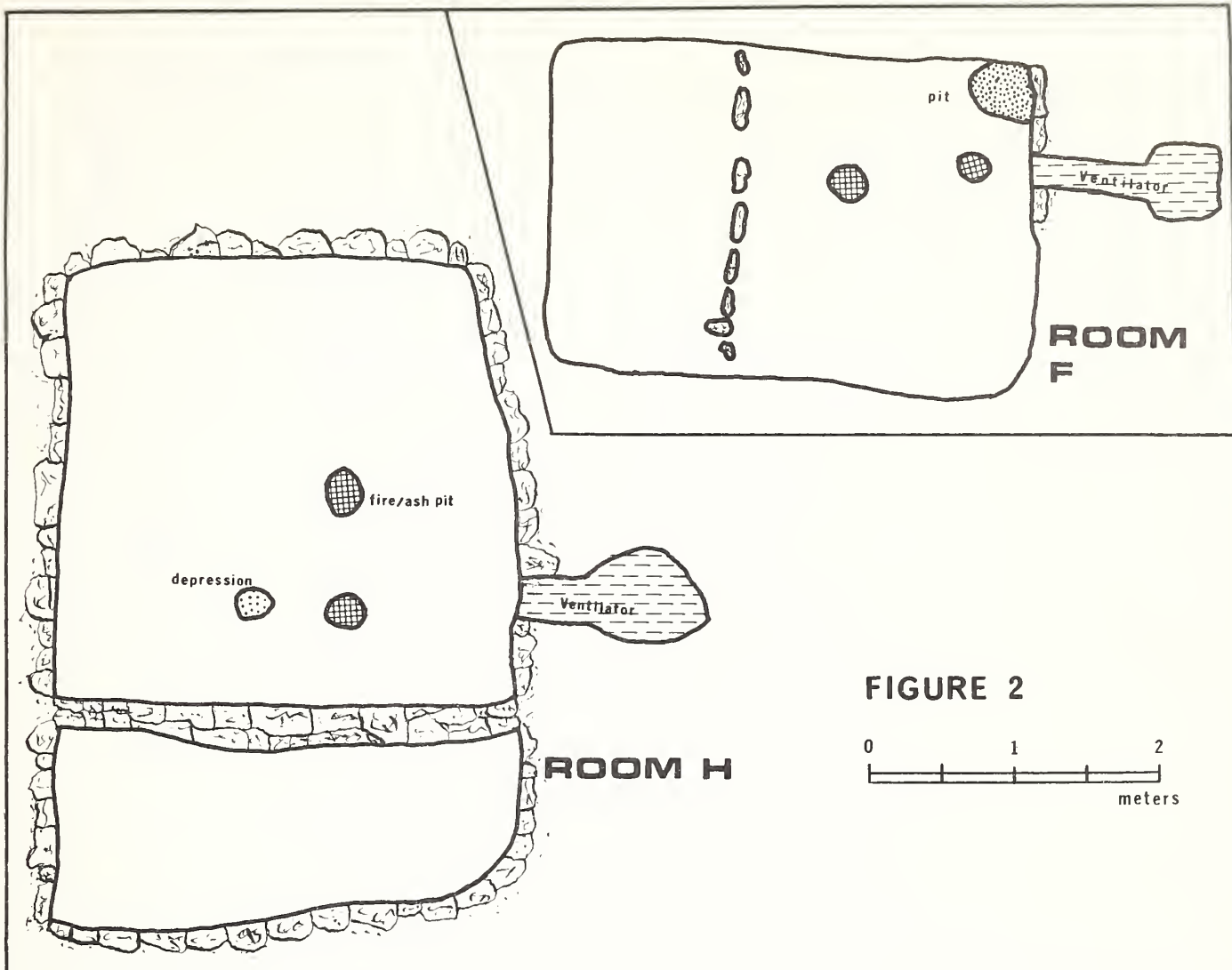
A further detriment to interpretation was the lack of fill for this structure. The walls of Room C actually curved down along the edge of the depression of Room D to follow the contour of the walls and floor. This seems to be adequate evidence to suggest that Room C was built soon after Room D was abandoned, and fill did not accumulate. A layer of clean dirt was under the walls of Room C, possibly placed as a base for the wall stones rather than an accumulation during a hiatus between the abandonment and collapse of Room D and the construction of Room C.

There was a thin layer of ash and charcoal on the floor of Room D which led us to believe the room may have burned. The layer was extremely thin, only a centimeter or two thick, and spotty.

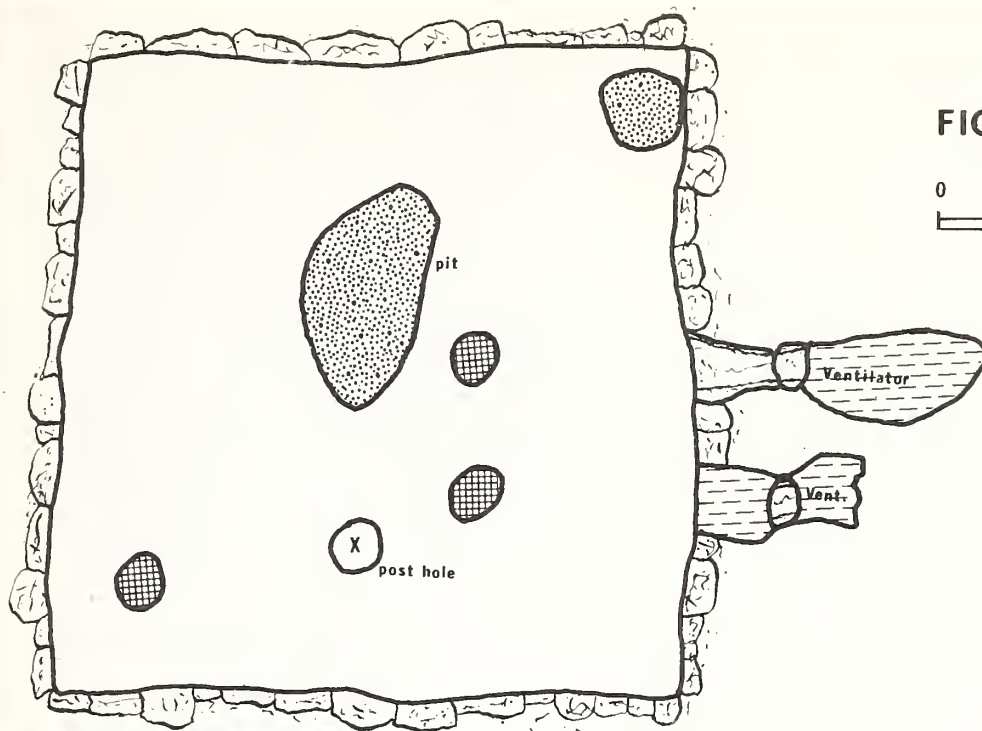
The stratigraphic placement of Room D is the only clear relationship now between it and any other part of the site. It was probably a habitation, post-eruptive, since some black cinders were sealed under it. Its use as a sudatory is possible. It is the smallest structure discovered at this date at the site.

#### Room F

This room was adjacent to a large pine with an established root system through the walls and fill of the room. These roots presented quite a problem during excavation, especially since the attempt was made to preserve as much of the natural vegetation as possible.



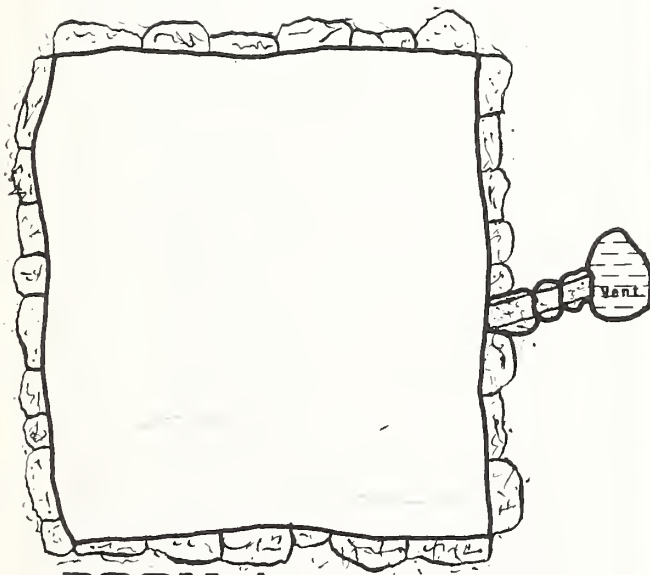




**FIGURE 3**

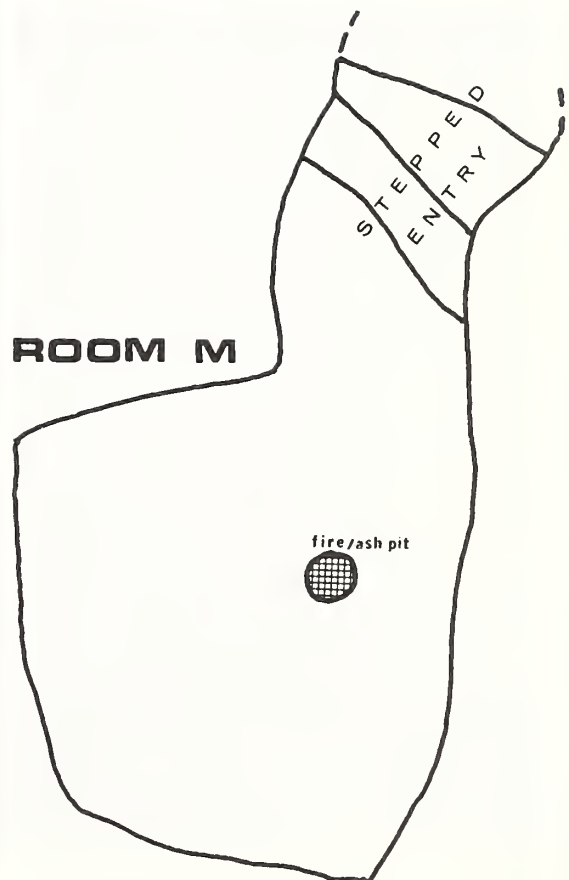
0 1 2 meters

**ROOM L**



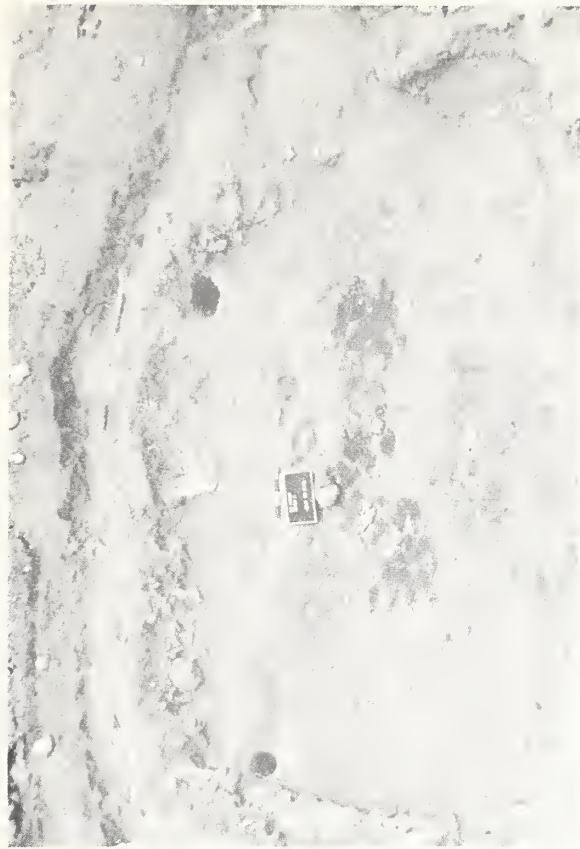
**ROOM J**

**ROOM M**









b. Room K, toward north, entry to right.



d. South wall of Room J.



a. Room L, toward north, vent to right.



c. Room H, toward north wall, pots on floor.





Room F was originally constructed as a pit dug to a depth of about one meter, some masonry wall materials were used, but most of the structure was earthen. Where masonry occurred, the pit was filled between the masonry and earth. The pit walls were partly plastered and this was done directly on earth. The inner faces of masonry were also plastered, as was the floor. A ventilator was constructed by excavating a one meter long trench from the east edge of the pit and lining it with rock. The plan of Room F appears as part of Figure 2.

A pair of pits, perhaps fire and ash, were found in the floor. A pit toward the corner of the room near the ventilator contained sherds, bones and a three-quarter grooved axe. This pit had been cut through the floor into the underlying red cinders. The pit was filled with the angular black cinders probably derived from Sunset Crater.

A small hole in the center of the ash filled pit (from fires associated with this house) could have been a post rest, although it was not clearly so defined. The firepit was heavily burned and contained no cultural debris.

An interesting feature was encountered in the westerly portion of Room F. A line of rocks had been placed across the room and the area between the rocks and the western wall had been excavated into the underlying cinders. The cinders were layered in an undisturbed fashion and nothing had been buried in this area. In the clay layers above the cinders was evidence of an earlier portion of this room. In fact, the area had been replastered and a final plastering covered part of the rocks which delimited it.

It was hypothesized that there was a series of potential uses for the area: a covered mistake in the original excavation for the house, a pit filled with pine needles and similar materials for bedding, or other purposes.

The ventilator was lined with rock except for the lower part of its horizontal portion and it was also plastered with clay on the sides and bottom of its tunnel. The top of the shaft opening was only slightly below present ground level. Packed surfaces were

found at this level to the south of the room, suggesting that this was the level of a used surface. There were no indications that the ventilator had an above ground chimney. It is possible that some form of roofing or wall extension determined the distance between the pit house and wall and the opening of the ventilator. This is another problem further excavation should answer.

Entry to this room was probably through the roof. The quantity of rock in the fill indicates that the masonry walls were high enough to enable the inhabitants to stand in the interior.

#### Room H

Room H, see Figure 2, was the most intriguing excavated room at NA10,937, raising many questions of interpretation. The room was constructed in essentially the same manner as Room F, with the primary difference being the use of masonry walls all the way to the floor of Room H. There was no deeper area of this room, as in Room F. The ventilator was constructed much to the same pattern as that of Room F.

Two pairs of pits associated with burning were found in the floor of this room. It was not determined whether they had been lined with clay or if burning produced the appearance of clay linings, but the former seems likely. One of each of these pairs of pits appeared to have been primarily used for fire and the other for ash. The pair of pits in the south of the room had been abandoned and sealed under a floor. Finally, a probable post near the center of the room had rocks set next to it. It was sufficiently shallow that it could have been the base for a notched log for roof entry, although it may have been used for other purposes, such as roof bracing.

There were some problems in interpreting the contents of this room which were not resolved. They had to do with the floor surface, the clay on it, and the artifacts associated with both. The room contained numerous items at the depth of the floor. Plate 3, c, shows the six broken pots (probably storage vessels) worked and unworked sandstone fragments, mano remains, bone, hammerstones, and a few other items found. It seems an incomplete assemblage for a rapidly abandoned house where other implements, such as

metates, should occur. Further, the pots partly rested on clay which was laid down in thin layers. Its occurrence under the pot sherds was sporadic. This contrasts with other items which rested directly on the floor.

The room appears to have experienced a roof collapse in which the entire roof came down in essentially one piece. Afterwards, some of the relatively pure clays of the wall plaster washed from the upper parts of the standing walls and seeped through the roof detritus to the floor. In time, the pots were further broken (people walking on top of the collapsed roof, for example) and this could account for some sherds on top of these clays. The clays were not in this pure form throughout the fill of the room and must represent a rather special occurrence. The condition of the pots and other materials suggests that this room was affected by some such disaster as outlined above since the room did not burn.

It was discovered at the end of the first season that the floor of Room H continued under the south wall of the room. During the second season, excavation continued to seek another room which was contiguous with Room H. However it was learned that Room H had been remodeled into a smaller room through the addition of a wall just south of its center. The remodeled Room H was about three meters square, where it had originally been three meters by four meters in size. The remodeling had been done in a relatively short time with the south part of the room sealed off and then filled. A set of firepits which had been directly opposite the ventilator was apparently sealed off and a new set made in the center of the newly formed room. The ventilator was not altered or relocated. The original room had a rounded southeast corner, but the southwest corner formed a ninety degree angle. No additional floor features were found. Some fingerprints were seen in clay between rocks near the southwest corner. There was evidence that the floor plaster and wall formed a continuous slope.

Three poorly preserved infant burials were located in the

southwest part of the original room, below floor level. One was beneath the west wall of the room near the southwest corner, and it had been placed under the wall sometime after the room was constructed.

A probable reason for remodeling was the collapse of parts of the southeastern and southern walls of the original room. If the interpretations are correct, the new wall was constructed either against fill or fill was placed behind it quickly (the outside of the wall was not finished, for example). If the fill was placed quickly, the original walls of the room would be braced by it and could not further collapse inward. Since in two places they had either collapsed almost to floor level or were dangerously overhanging, it was assumed that some form of collapse preceded the remodeling.

#### Room J

This structure was initially excavated as were all other rooms, with an alternate quarter technique. It was suggested by those excavating the room that it might be productive to note the distribution of all rock within the fill and to dig the quarters by levels. This was partly done, but too late to provide a comprehensive study of the structure. In essence, about the same is known of this structure as the others. It is mapped as part of Figure 3.

Room J did present some special problems. It was built above part of Room M, with the result that the usual hard-surfaced floor was not present in parts of the room, and walls were somewhat uneven along the area of the former pithouse. An additional difficulty was the lack of clear definition of features in the disturbed fill of the underlying pithouse. Upon first discovery, the edge of the underlying pit was thought to be a possible bench of Room J, since its positioning was appropriate. Some work was done with that potential in mind so that its ultimate clarification was sometimes faulted by misdirected approaches to excavation.

It was determined that Room J was an essentially flat floored room which was excavated some eighty to ninety centimeters into the original ground surface. The basal course of the walls was



comprised of essentially vertically placed stones, see Plate 3,d, with their longest dimensions upright, much like a slab-lined pit-house. Very little was preserved above this first level so a statement is not possible about the remaining construction except that there was sufficient rock for full height stone walls and the remaining rocks were not as large as the basal rocks. Rock fall was studied to the north of the room, see Plate 5,a, but it was not instructive about the original positioning of rocks in the wall.

Room J was stone walled, with clay and sherd material in the fill of the wall itself. Nothing indicated that the walls had been plastered, but fragments of plaster in the western part of the structure indicated the floor was originally covered. The shallowness of this room and its small size of about three meters square suggested a specialized function, or perhaps a date which does not coincide with other rooms. No definite firepit was identified, but there was an area of burned materials in the eastern part of the room.

An infant burial was found either below the floor of Room J or in the fill of Room M. Its relationship is not clear.

The rock-lined, well-made ventilator was in the center of the east wall, and opened at floor level. It had fallen rock around the shaft opening in appropriate quantity and location to suggest a very low chimney or some kind of screen covered its opening; although these same rocks could have come from the collapse of the east wall of Room J. Plate 5,c, is a view into the Room J ventilator from above, and outside the room.

The room appears to have been cleaned of its contents when abandoned. There was no evidence of its having burned.

#### Room K

During the season of 1974, excavation into one of the grid units (note the interruption on Map 2) produced plastered wall and floor evidences. It was covered until the 1975 season and a return was made to complete excavation. Procedures did not include quartering since there was absolutely no surface indication of its size, shape or directioning. The preservation of this room

was quite poor with the best preserved portion being the first located wall section. Our procedure was to outline the structure, leaving part of the center of it for cross section information. Some fragments of floor and walls were found in several places, indicating it had originally been plastered and these helped in defining the structure. The information we were able to obtain is shown as part of Figure 2 and in Plate 3,b.

This was originally a rather large room which had been excavated into the slope of this hill. The entry was apparently stepped at the edge of the floor and then sloped upwards toward some indefinite place to the east. It was poorly defined. Sterile soil was used to make assumptions, not clay or other positive evidences of the entry itself. No post holes were associated in the entry. The possibility that it was a ventilator was ruled out since the entry was too high above the floor.

Fire or ashpits were located off center to the east, reinforcing the idea of entry from that direction if such patterning based on other structures is considered. There were four post holes located in the corners of this essentially rectangular structure, and six other holes were located in the room in such places that they could also have been major support post holes. One contained a large wood fragment suitable for tree-ring dating. None of these holes was as well defined as one would wish. They were all irregular, but tended to be vertical. The room appeared to have burned since charcoal and ash were found through much of the structure but little was preserved in large enough pieces to form patterns.

A crushed jar was located near the north wall and three manos were on the floor. Other expectable household utensils such as metates were not there.

A search was made along the rim of this structure for post-holes, around the outside of the house, but none was positively identified. Another good specimen for dendrochronology was found there. Dates are not available from these specimens at this time.

The reconstruction of this house and the events around it includes the following observations: it was excavated into the ground on this hill slope, with the west of it buried more deeply



than the east of it; it was built with a framework which supported an essentially rectangular roof, but there is no certainty of the actual number of supports used for it; an entry was built to the east; the walls of the pit were used as house walls, and a superstructure was erected by placing posts outside the larger pit at a level above the floor and nearer the surface of the ground, if not on it; the actual shape of interior post holes is such that it is possible they were dug to allow posts to be slipped into them after the house was standing, and these posts were additional supports inserted to protect a collapsing roof. It appears that the dwelling burned and was abandoned. The deepest portion on the west was covered with soil rather rapidly and was thus protected and preserved. The remainder was exposed to erosion for some time and is poorly represented today.

An initial assessment of debris from the fill of this room indicates it is somewhat earlier than most of the remainder of the site.

#### Room L

This structure, just under four meters square, is the largest and most impressive masonry subsurface structure at the site, see its plan as part of Figure 3, and a view of it on Plate 3,a. It has two sets of ventilators and two sets of firepits with one set centered and one set more to the south of center. The south wall of this room also appears to be resting on floor and it butts into the east and west walls. It is possible that the excavated portion is only a remodeled section of this room and additional work is necessary to find the remainder of it.

A large post hole was found just south of the center of the room which could fit the pattern for other Sinagua structures. A pit just north of the center prevented recognition if a post hole was present or not. Several other pits went through the floor of this room, with one on the northeast corner seeming to be the only other one made by the occupants. The other irregularly shaped places may have been caused by tree root growth, burrowing animals or other such non-human activities.

A fire area and some clay layering under the floor in the southwest part of Room L suggested that the room's construction may have destroyed a still older structure. This possibility will be explored in our 1976 session.

The lack of household items suggests this structure was not abandoned hurriedly. There was a particular interest in the pattern of fill of Room L. The collapsed wall rocks crowd the lower part of it, as can be seen in Plate 5,b, while the upper part of the fill is relatively rock free. We think we will be able to develop further information on room collapse and fill processes.

#### Room M

This structure was located under Room J. In fact, about two-thirds of Room J was built over it. This pithouse was dug to a depth of about one and three-quarters meters. It tended to be essentially square with the east to west axis about two and one-half meters and the north to south axis about three meters. There was a firepit just east of the center of the room and a gap in the sterile soil directly east of this firepit which could have had a ventilator function but it was uncertain. Note the plan, Figure 3. It appeared that during the aboriginal excavation of the pit for the room a very large boulder was found. It was too large to remove and so was left in place to form part of the north wall. An entry was made just to the east of the boulder. This opening lies immediately adjacent to the northeast corner of the room and opens through the north wall. It is stepped at least three levels within a distance of at least two and one-half meters. Beyond this additional interpretation is impossible because Burial 12 had been intruded into it. No direct evidences of roofing, post holes, etc., were found.

Again, this appears to have been a habitation structure, and one which was not hurriedly abandoned. It appears, both from stratigraphic evidences and an informal ceramic analysis, to be an earlier structure than other parts of the site.

### Summary of Subsurface Rooms

Again, as for the surface rooms, the evidence for the following summary is not totally included in this report. We want to emphasize that this is an interim report, and the following statements are only tentative.

1) All subsurface rooms are independent constructions, without physical contiguity with surface rooms or each other, except for stratigraphic associations.

2) Subfloor burials and firepits are a part of the pattern for subsurface rooms. Post holes were rare as patterned integral parts of the structures, except for Room K.

3) Construction of subsurface rooms entailed excavation of a pit larger than the final room. It appears a ventilator was included in the original planning when masonry rooms were built. The essence of the house and its ventilator was a structure placed within an excavated hole. Walls and floors were given a clay coating.

4) The depths of these structures varied.

5) The rock in the fill of the masonry rooms was sufficient to suggest they were constructed with masonry walls to the level of the roof.

6) The masonry walls were not well executed in an aesthetic sense, if abundant dirt and varied sized rocks mean that. The structural safety of the walls may also be in doubt, as seen in Room H.

7) Nothing has been found to demonstrate that the masonry subsurface rooms were synchronous or not with other structures at the site. Informal sherds analyses suggest there are temporal differences between them and some earthen-walled subsurface rooms.

8) The items in Room H indicate rapid abandonment. Room H is unique in that respect.

9) The ventilator seems to be an essential feature, and care was taken to construct it. It was begun at floor level, sloped gradually upward away from the wall and turned abruptly upward to the surface of the ground. There were no positive chimney remains above the ground level, but it is possible that such a feature had occurred in Room J.

10) There is no clear evidence of ventilator deflectors or covers.

11) There is a pattern of a probable ashpit in front of, and not too far from, the ventilator opening. Somewhat more toward the center of the room, but still in the same quarter of the room as the ventilator, is the firepit.

12) The lack of side entries leaves the alternative of a roof entry, but we have no direct evidence for that.

13) There was debris throughout the fill of all these subsurface rooms, but nothing to clearly indicate activity in them after abandonment.

14) The subsurface rooms, with the exception of Room D, appear to have had similar functions as habitation areas. We do not mean to exclude Room D, it is simply impossible to know from the data. We defined no special ceremonial structures.

15) Finally, a statement is also appropriate about the subsurface rooms and their importance to our original hypotheses. The fact that these rooms appear to represent a continuum for up to two hundred years (a.d. 1100 - 1300) is significant in that they appear to have changed their house styles somewhat at this site. Some of the masonry walled subsurface rooms were synchronous with the surface rooms. If our hypothesis holds, that experimentation with shelter types is indicative of instability as a result of stress, then we may be dealing with such data. More corroboration is obviously necessary from the other stress hypotheses. One of our graduate students, Mr. Robert MacBride, has undertaken a comprehensive study of Sinagua architecture which we expect to contribute meaningfully to questions such as those raised above.

#### Exterior Walls and Stripping

The exteriors of the surface rooms were defined by cleaning away enough of the upper part of their remaining walls to be certain of their identification. There was no concern with the removal of earth to the old ground surface in this initial activity.





a. Burned clay in Activity Area G.



b. Large depression, clay bank to lower left.



c. Cinder dune being trenched.



d. Large burned area in Activity Area E.





a. Outside north wall of Room J, wall fall.



b. Room L fill, note rocks on bottom.



c. View into ventilator of Room J.



d. Pots inverted over cremation material in mound.



Several walls were discovered toward the south and south-east of Rooms A, B and C. Work was progressing in the tracing of these walls as each season ended in the field. In the northwest area, adjacent to Room A and along part of Room C, a search was made for outside features. This was developed to a distance of about two meters from the west wall of Room A, and somewhat less developed to a distance about one meter beyond that. We did not reach an old ground surface, and no features were discovered.

An additional area of earth was removed south of Room F. In this case an old ground surface was discovered at a depth of between fifteen and twenty centimeters. No remains on it or in it defined work areas.

A considerable amount of work was completed in the area to the south of Rooms B and C, part of which is shown on Figure 1. This was an area of concentrated excavation during the second field season, and it yielded considerable data. An old ground surface was located to the southwest of Room C. The surface was not particularly informative as a level which produced artifacts, particularized debris, or anything else but it did give a control for a better understanding of the construction of the surface rooms.

It is probable that the inhabitants of this area excavated somewhat into the surface of the ground before beginning their surface rooms. The surface used for this determination, however, may not have been the surface when the walls were built, so this problem needs further examination. In this instance, the original procedure has been counterproductive since the walls were outlined to such a depth that this surface was disrupted next to them. It is not clear if this surface was disrupted by the erection of the walls or if it occurred after the walls were erected (i.e., if it was also placed against the walls we would assume the latter). A further surface room appears to be located in this same area, and it may still be possible to resolve the question.

Immediately south of Rooms B and C is an exterior work area, designated Activity Area E. It was assumed not to be roofed, although rock alignments do occur in expectable wall areas. There

were insufficient rocks in the vicinity to construct walls of anything more than a half meter or so in height. One wall, to the east, did have an opening through it which was quite similar to the one in Room B as can be seen in Figure 1. There was a burned area in front of this opening (to the west of it) but this was an exceptionally large burned area within a pit, which had last been covered with large rocks, shown in Plate 4,d. Some finely preserved charcoal specimens were removed from it. There were also several post holes to the west of this burned area, but they did not form a recognizable pattern. No temporal controls were possible. The assumption was made that they were probably associated with this fire area and represented supports such as roast spits, etc., of different times.

Someone had dug a recent hole in the southeast part of Activity Area E which still had branches and needles in it. The disturbance could have removed evidence for construction of some sort of wall which would have made this a formal room rather than an outside area.

The area appears to have been open, but with the distinct possibility that it was being walled at the time of desertion, accounting for the low masonry alignment which was found. The east wall had been built to sufficient height that its collapse to the east over Room H gives us clear evidence that Room H had been abandoned and mostly filled before this wall collapsed.

Another area to the south of Room C was uncovered which contained some interesting material. This was designated Activity Area G, and was walled on three sides with a possible partial wall on the fourth. This area is shown on Map 2. No surface, fire area, or other feature was discovered which could be said to be evidence for concentrated activities here. There was a considerable quantity of well burned clay toward the south of the area which had impressions of beams and the smaller materials one would expect to be parts of a roof. These impressions were excellently preserved. The clay continued under another possible surface room wall to the south which is yet to be excavated. Plate 4,a, shows this burned clay in place. It seems that there was an intense fire in a room elsewhere on the site, the room

was cleaned out and the clay from its roof was thrown here. We do not think the clay comes from a former roof over any part of Activity Area G.

A general comment on the areas outside rooms is possible to the effect that a general paucity of bone may equate with a lack of hunting. It may also equate with cleanliness around housing, the presence of dogs eating bones, and the like. We've found nothing in these activity areas which is particularly satisfying to hypotheses regarding procurement activities.

## CHAPTER III

### TRASH AREA

The slope downhill and to the east of the dwellings has a large quantity of materials on the surface which suggests it was an important trash deposit location. It is not the only such area.

A grid system was used to cover the areas of this eastern slope where it was thought certain there was a depth of trash. Map 2 shows its location. Numbers were assigned to each square of the grid and fifty percent of the total squares were selected by the use of a table of random numbers. Several of these selected squares have been dug, including one complete line to provide across-section up the slope of the hill to the housing area. This cross-section included several squares from our sample as well as a few additional squares. They were all dug in arbitrary, twenty centimeter levels and the earth was screened through one-eighth inch mesh hardware cloth for the retrieval of cultural debris. Natural levels were not found and no deposits were seen to be different from each other.

The analysis and synthesis of materials from these areas is not complete at this time. Much more excavation will be done in this and similar deposits at the site. We have done too little here to make any statements about our original hypotheses.

One test which is underway is a comparison between the surface materials from a unit and the actual subsurface contents of the unit. We are interested in the question of whether surface materials are accurate, or in any sense adequate, indicators of subsurface materials.

### MOUND

When the site was originally surveyed a mounded area was noted down the hill to the east of the occupation area. Its location is shown in the designated part of Map 2. This mounded area was regular in shape, rising to about one-half meter in its center and sloping away from that in all directions about equally except that it had a slightly longer axis running north to south.

This feature had the potential, located on a slope as it was, of being created intentionally by the early inhabitants. It was excavated during the 1974 field session to test that hypothesis.

Twenty grid squares, two meters on a side and arranged in a rectangle of four by five squares, covered the complete mound and adjacent areas; its extent can be seen within the double lined area on Map 2. It was determined that excavation of six of these squares would produce cross-sections of at least one side of every square on the mound. Excavation was in twenty centimeter levels and all the material was screened for cultural debris across one-eighth inch mesh hardware cloth.

This mounded area follows the contour of the original ground surface, and is mounded simply because trash accumulated on it as it accumulated around it. There was no evidence it had been purposely constructed. In order to gather further information on the geographic segregation of burial types (see the section on burials) an additional five units were excavated during the 1975 field session.

#### LARGE DEPRESSION

A large depression was noted during survey, lying about thirty meters to the south, southwest of the main architectural features of the site (see Map 2). It was originally estimated to be about ten meters in diameter, and round in shape. The presence of a large, circular structure at Wupatki was intriguing enough to insist that this depression be excavated.

A Museum of Northern Arizona archeologist was in charge of the specific work. The usual quartering of the depression for obtaining cross-sections was done. The southwestern quarter was arbitrarily selected to begin and work was started along the lines of the quarter from the sides to the center of the depression. The finished excavation areas are shown on Map 2, extending larger than the actual depression itself. A marked depression was discovered with a higher edge at the west and south and a deep portion centered in the area being excavated. There was no masonry.

An elevated area was found along the southwest edge, and it



was excavated by a stripping process to examine color variations. The feature's surface should have been followed since it was perfectly evidenced. Plate 4,b, shows the feature at lower left. It was thought during excavation that this could be a bench, and if so it would have had an essentially flat surface. Later it was concluded that it was a remnant clay bed which could have had impressions in it from clay removal activities, but the excavation procedure did not allow such an examination.

The entire southwest quarter was excavated to a sterile level, producing considerable quantities of cultural debris in the fill. A collection was made as the work progressed.

A superficial examination of the clay color and the constituency of the bench-like level of the southwest quarter led to recognition that it resembled clays on other room walls and floors. Professor Goldfried experimented with it, wetting and plastering it to rock. This strengthened the conclusion that it could indeed be a remnant from borrow pit activities.

The next procedure was to excavate the northeast quarter of this depression. It had not been originally scooped out as deeply as the southwest area. It was not thought necessary to dig into the remaining quarters. The finished work can be seen in Plate 4, b.

It is our interpretation that this area was the result of a fairly concentrated removal of clay for building purposes and perhaps for other purposes. Excavation uncovered a man-made depression which was oval rather than round. It covered about two-thirds of this entire large depression with its greatest depth toward the southwest where the remnant clay bank is still located. After it was abandoned as a borrow pit, the area was used in the same way as the remaining slope of the hill away from the site to the west. It became a place to deposit trash (although not in the quantities as to the east of the site) and burials.

The significance of the clay from this depression was seen late. It was not known that the clay deposits within the depression area differed. It is impossible, from the completed



field work, to estimate the amounts of clay which could have been used from this area and thereby make a statement about the size of a group using the pit. Further, there are no temporal controls to permit an estimate of the length of time it was used. It is not known if this could have been the source of clays for other sites, or even if it was the sole source of clay for this site.

The only completed soil analysis from NA10,937 is the result of seven examples of clays or clay-like materials from this site. The examples were kept to provide information relative to the hypothesis that the large depression to the southwest was created by the use of that area as a borrow pit.

We are indebted to Professor James Post of California State University, Sacramento, for his important contribution to the following. He performed X-ray diffraction and grain size distribution studies, critiqued our collection practices and offered opinions about the results of his studies. Any errors in the following interpretations are those of the authors of this report, not Dr. Post. His tabulation of the estimated mineral contents of the seven examples is attached as Appendix A, along with the grain size distribution curves for two of them.

Examples 1 and 2 came from the large depression; 1 came from a remnant bed of materials which formed the bench along the southwest part of this large depression, while 2 came from an undisturbed layer in the northeast part of the large depression which was originally thought to be the same material as 1. This was the first correction Dr. Post was able to make: examples 1 and 2 are not the same materials, in fact the material from the northeast side of this depression does not have enough feldspar in it to be associated with any of the other examples; and it is not suitable for building material as constituted (Clough 1950). Prof. Post pointed out the danger of assuming too much from color likenesses or differences or from superficial observations of consistency.

The most closely associated materials came from examples 4 and 5. These were from Room C, with 4 being deposited material just above the floor, and 5 wall plaster. This strengthens the idea, but does not demonstrate, that wall and roof collapse is

aided by covering and binding materials being washed out (by rain, for example). In this case the wall material apparently collected immediately above the floor. Both of these are like example 1, and so much so that they could have been obtained from that outcropping.

Example 6 came from roof material in Room H. Again, this is material which could easily have come from the bed producing 1.

Example 3, which came from just above the floor in Room A, and example 7 which was wall clay from Room F, came from similar sources. It was Professor Post's opinion they could have come from the bed producing 1 providing they had been winnowed or otherwise exposed to wind. In fact, 7 looked winnowed to him because the quartz content was so low.

There is an additional problem in these materials. One and 2 lack degraded mica (illite), and others (4, 5 and 6) contained it. This lack may be the result of an inadequate removal of a portion of the bed in the field, and the illite may be present. Its lack is not sufficient to say this bed is not the original source for the other examples.

Finally, only the following statements are possible at this time: 1) Example 2 most likely does not come from a bed which could also be the original source of any of the others; 2) Example 1 comes from a bed which could be the source of the materials for 4, 5 and 6, as well as 3 and 7 if these latter had been winnowed; 3) Other places are not excluded from being the source for the above (other than 1 and 2); 4) Samples must be adequately made using criteria we have not used (we used only color, consistency and context) for determining collections to be made.

#### CINDER DUNE TEST TRENCH AND PIT

In a drainage about one hundred and sixty meters west of the site is an area which appeared to have been dammed by a large dune-like formation of cinders. These are the black, angular cinders generally associated with the eruption of Sunset Crater, so their occurrence led to the assumption that this

formation developed within a time period which could have been synchronic with the occupation of this site. The dune formation crosses this small drainage at almost a right angle to its direction of flow. Upstream from it is a relatively flat part of the drainage system, with no discernible channel in it, and downstream is a rather more precipitous-sided drainage. Any construction across the drainage would likely be placed in such a location to maximize field size behind it, if it was intended to halt or impede water runoff for cultigens.

It was hypothesized that the dune was the result of cinders accumulating from wind action on a constructed obstruction to water flow, and the obstruction would be seen in profile if the dune was cut through at a right angle to its long axis. A single cut, about two meters wide and fourteen meters long, was made as shown in Plate 4, c (in process). The depth of the cut was determined by the height of the dune and the discovery of pre-Sunset Crater soils beneath it so that it varied between one-half meter and two meters. The pre-Sunset Crater soil was a clay and rock mixture which was quite easily distinguished by consistency and color.

Although there had been no rain for at least a month before the excavation of the dune, it contained considerable dampness. It dried out rapidly and walls collapsed when the slightest breezes hit them. A complete cross-section was studied by Dr. Richard Eastwood, a geologist from Northern Arizona University whose special interest is vulcanology. The following is a result of his statements. We only received a verbal report.

It was stated that the underlying older layer was a deposit of clay and rock which occurred about one-half million years ago and was associated with the Turkey Hills eruptions. Above that was a primary deposit of layered cinders from the eruption of Sunset Crater. These have not been disturbed since then except for probable rodent and root penetrations that left holes which then filled with intruded materials from upper layers.

It was decided, on the completion of our discussions, that the upper part of the cross-section, about a meter at its thickest,

varies from essentially pure cinder at its bottom to a light soil at top. Some post-eruptive sherds occur in this upper area, as do some rocks showing alterations by man (one was a battered, three-quarter grooved axe). Some signs of wind-blown deposition occur in the upper layer.

It was not ruled out that man participated as an active agent in the building of this mounded pile, at least the upper parts of it. A search was made for digging stick or other impressions in the soils, but they did not occur. There were no lenses of water-deposited soil upstream from the dune, and a pit was dug in the flat to test this. There was no dam beneath the dune.

It appears that the dune itself would act more as a filter than a dam; however, there is no evidence to show that water has flowed in this drainage system since the dune appeared. There is no channel cut above the dam and none around the end of it.

Pollen samples from various places around the excavation may allow statements about the ecology at the time of the eruption of Sunset Crater. Pollen samples were also taken to determine whether or not cultigens were grown on the dune or upstream from it in the flat.

## CHAPTER IV

### ANIMAL BONE

Some of the sparse bone material from this site has been examined by Mr. Wayne Wiant, a graduate student at California State University, Sacramento. He is to be given credit for work toward recognition of most of the faunal remains reported thus far.

About ninety percent of the non-human bones were of mammals and include the following forms (counts and percentages are not complete, this is simply a presence/absence list):

- Order:     Lagomoipha  
              Leporidae   -   Hares and Rabbits
  
- Order:     Rodentia  
              Fissipedia  
                  Sciuridea -- Squirrels  
                  Geomyidea -- Gophers  
                  Cricetidea -- Rats and Mice  
                  Erethizontidae -- Porcupine
  
- Order:     Carnivora  
              Canidea -- Coyote  
              Procyon and Vulpes -- Foxes  
              Procyonidae -- Raccoons  
              Mustelidae -- Skunks, Weasels, Badgers, Otters  
              Felidae -- Bob Cat, Mountain Lion, Lynx
  
- Order:     Artiodactyla  
              Ruminantia  
                  Pecora -- Deer, Antelope  
                  Bovidae -- Mountain Sheep
  
- Order:     Insectivora  
              Talpidae -- Moles

Birds amount to about eight percent of the faunal material with a range from small, sparrow-like birds to what appear to be large ducks and possibly hawks. The groups which are probably represented (an expert is needed for corroboration) include the following orders: Anseriformes (ducks, geese and swans); Strigiformes (owls); Falconiformes (vultures, kites, hawks, falcons, eagles); Galliformes (grouse, quail, pheasants); Piciformes (woodpeckers); and Passeriformes (ravens, crows, and many other North American small birds).



A few bones were identifiably fish, reptile and amphibian but their specific identification also awaits expert assistance.

We are not prepared to assess these remains for their food use, and expect further work at the site to add considerable information since bone is well preserved.

#### RAW MATERIAL

Few perishable materials were preserved at the site. There are plans for particularized attempts (flotation, etc.) for the recovery of such remains, but we had no success the first seasons. Soil was taken from various rooms for various types of analyses such as pollen analysis, but these remain to be completed.

All shell was modified, and we found none we thought was waste material.

There was a paucity of wood, even in charred form, for dating and other purposes.

The stone from the site was overwhelmingly of volcanic origin and used for construction purposes. This was both in terms of bulk and in numbers of pieces. The site produced many lava formations, usually in the volcanic bomb category, which were likely parts of the landscape before men arrived to live on this knoll. There was abundant cinder or ash deposit on and within the site from volcanic sources in the neighborhood (directly and indirectly). This included red cinders from older eruptions as well as the black cinders, angular in form, which are commonly attributed to the eruption of Sunset Crater. No evidence of rocks, other than those of volcanic origin, was found in the immediate area of the site, and it is understood that the nearest non-volcanic materials are at the foot of Mt. Elden to the west, in Walnut Canyon to the south, near Winona to the east and in the neighborhood of Wupatki to the north (see Map 1).

The site also produced much sandstone, most of it in flat pieces with flattened surfaces evident. Since sandstone occurs with naturally breaking flat planes it is difficult to know whether these pieces were selected for their flat planes or the flat planes



were fashioned to be used or as a result of use. In some instances it is clear that the flat surfaces were intentionally fashioned. The sandstone is so abundant in some areas we thought it might have been used for construction, but none was found in standing walls and all of it was smaller than the in situ construction pieces. Most of the sandstone was red.

There were other minerals and rocks from the site; but these are of limited occurrence, and they have not been thoroughly analyzed. They include small pieces of azurite, malachite, several nodules of chert, jasper, petrified wood, and other workable stone. A study of these materials has been started by Mr. John Madsen, and Mr. Philip Keairns, graduate students at California State University, Sacramento, but it is barely under way.

The analysis thus far has not produced large pieces of rock with known sources more than a day's walk from the site. Truly exotic material is not abundant, although it is present. This includes argellite, mica, fossils and turquoise that we have been able to identify. All the turquoise found was worked. These relatively small pieces may, and probably did, have their sources at some distance from this site. Their specific sources are not yet known but we believe they are indicative of trade.

The large quantity of sandstone at the site seems to have a special significance. One hypothesis is that it was essential to a wood working tradition. Finished beams for houses, religious and utilitarian items of wood, tools, and other wooden products could have required this material for finishing processes.

Future work will include an examination of several basalt outcroppings around the site for evidence that they could have been quarries for construction material.

#### ARTIFACTS

Studies of the artifactual material from NA10,937 are now in progress. Any statement made at this time is based on incomplete examinations of the data. Further, the studies being done are based on an incomplete sampling since it is expected the artifact

inventory will grow in the immediate future. The ultimately effective syntheses will be made from the finished, entire collection.

A few tentative statements may be made: 1) Artifacts were found in all the expected categories of non-perishable materials; 2) Perishable materials were minimally preserved on the site, even as charred remains; 3) The immediate observations of the artifactual materials show that they are homogeneous, made in generally repetitive forms, and made of materials which do not appear to have come from distances beyond Sinagua cultural boundaries (with the exceptions of shell, a few pots, one clay figurine, and some few stone items; 4) There is little evidence that items other than the probably indigenous brownware pottery were made at the site. No waste portions of shell or turquoise; but debitage from flaking rock occurs in small quantities where we have excavated. No extensive manufacturing areas have been found; and 5) There is nothing thus far in the artifact inventory to require any change in previously developed artifact inventories for the Sinagua.

Initial analysis of the ceramics has yielded some quantitative data. About 187,700 sherds were collected in the two field sessions. Of this total, 171,950 were Alameda Brownware. The pottery remains fall overwhelmingly within Wilson's Ceramic Group V and VI, with a significant amount within his Ceramic Group IV. (Since Wilson's dissertation has a limited circulation, these ceramic groups are included as Appendix B.) This means the classic Padre, Elden and Turkey Hill phases are represented at the site, but the preponderance of the debris is of Elden phase. There are intriguing suggestions of a pre-eruptive occupation from evidence found in the trash area, but not elsewhere at this time.

Any further statement about the ceramics from this site must await a sample from the entire site as well as a much more detailed study of the data all ready in hand. Our work suggests that there is considerable variation within types, greater than is contained in published descriptions of these types. Such statements, although

interesting, have no cultural meaning until they can be dealt with in a larger context.

Flaked stone tools occur, but debitage from the working of such items has not allowed us to make statements about work areas.

The ground stone tools were all shaped completely. We saw nothing we could interpret as raw material for such tools, at least not recognizably such. Again, however, the potential work areas have not been thoroughly explored.

Tools for food preparation are not readily classified, at least not functionally. Their usefulness for preparing agricultural or gathered products is apparent, but not separable. We feel the mano and metate complex is evidence for agriculture, but we have no verification at this time. There are projectile points from the site, items which may have been used for butchering or not, axes, battering devices and other things such as hoes which may have been used in a wide variety of procurement activities. It is, therefore, impossible to make a firm statement about whether or not the people at this site were using one procurement subsystem to the exclusion of another or if they were favoring one procurement subsystem, or even if they were using more than one subsystem. Our original hypotheses must be examined after our analyses are further along, and after we have excavated more from those parts of the site expected to produce waste materials pertinent to such questions.

## CHAPTER V

### HUMAN BONE AND BURIALS

The bone recovered from the site was not always immediately identified as human or not, a problem due to the inexperience of the field crews. This did not, so far as we can determine at this point, lead to the lack of awareness of a burial when one was actually encountered.

Human bone came from the fill of all the rooms but Room H. It also occurred in almost every other area or unit excavated at the site. Sufficient burned bone came from one of the mound pits to constitute a relatively complete adult cremation scattered through sixty centimeters of the pit from the top to that depth. Something between fifteen and twenty percent of the bone from the site was human, outside of recognized burial concentrations.

The distribution of this bone is germane to interpretations, although it is too early to draw conclusions. Examples of the distribution of bone include: fragments of human cremation in the fill of Room B; one infant femur in the upper part of the fill from Room C; the crown of a milk tooth below the floor level in Room F; and part of an adult skull, two phalanges, the distal end of an adult fibula and three epiphyses from an infant in the fill of Room A. None of these materials were split, cut or altered in any way to suggest either cannibalism or raw material for special uses.

Float bone occurred in all the pits we dug into the mound area. These were not all burned, but they mostly consisted of fragments and scrap. Again, there was nothing to show food or industrial use. The trash areas yielded both adult and infant fragments. The float bone leads us to the expectation that further work in this area will produce more uncremated burials. Only one fragmentary, uncremated burial (legs and feet) has been found on the east slope of the site.

Cremations and other forms of deposition of bodies occurred. The cremations have been limited thus far to the eastern portion of the knoll on which the structures are located. The other burials are located in various places. Cremated bone as noted above, does occur in places other than where the actual burials occur. One form of disposal of cremated remains is within inverted bowls as shown in Plate 5,d.

Of the total of twelve burials recovered from the site, three extended burials were in the large depression where it is thought they were intruded after it was partially filled. One extended burial was found immediately north of the north wall of Room J and a second just north of this point in the fill of the entry of Room M. An infant was recovered at a depth which suggests it was buried beneath the floor of Room J. Three other infants were buried beneath the portion of Room H which had been abandoned after remodeling.

Burial goods were mainly ceramic with ornaments being quite rare. We have no clear evidence of status distinctions thus far and so cannot make any meaningful statements as to regulatory subsystems at this time.



## CHAPTER VI

### SUMMARY

Four statements can be made which are pertinent to the original hypotheses. These statements are based mainly on the study of architecture at the site since this is the only part of the work which has been rather thoroughly assessed and reviewed.

- I. There is no evidence to indicate what, if any, environmental or cultural factors led to the abandonment of this site, but there is nothing to indicate drastic climatic changes. The site appears to have been abandoned in an orderly and unhurried way. There is no evidence of violence.
- II. The site contains at least two architectural and various burial forms. The initial analysis suggests that most are synchronic and may reflect the presence of more than one kinship group. There is also evidence that some of the architectural and burial diversity is diachronic.
- III. The lack of identifiable luxury, prestige, or status items in impressive amounts, the apparent evenness in distribution of differing items, and the mundane character of the total architecture lead to the assumption that there was no marked social stratification.
- IV. The above support the hypothesis that the population at this site was experiencing a period of cultural and environmental stability.

The hypotheses of the original research design have not been confirmed, denied or significantly altered by the work done thus far at this site. The research, at this point, is biased since it was not designed to be a completed effort but is only part of a study requiring further excavation at NA10,937.

The hypotheses of the original statement are being tested, and it is planned to continue to that end until the research effort is completed.

APPENDIX A



# Soil Samples - East of Flagstaff, Arizona

## Estimated Mineral Contents

<u>%</u>	<u>No.1</u>	<u>No.2</u>	<u>No.3</u>	<u>No.4</u>	<u>No.5</u>	<u>No.6</u>	<u>No.7</u>
Quartz	18	11	11	12	12	14	8
Ca-labradorite	15-20	5-15	10-15	10-15	15-20	15-20	15-20
Sanidine	5	5	5	5	5	5	5
Audite	15-20	10-15	15-20	15-20	10-15	15-20	20-25
Kaolinite	3	2	2	2	2	3	2
Illite	-	-	-	2-5	3-5	5-10	2-5
*M.L. Clay	10-15	5	5	10-15	10-15	5-10	5
Trace Minerals (incl.Magnetite)	5	5	5	5	5	5	5

The samples contain significant amounts (to one-half) of unaltered non-crystalline volcanic ash. Silical gels are present.

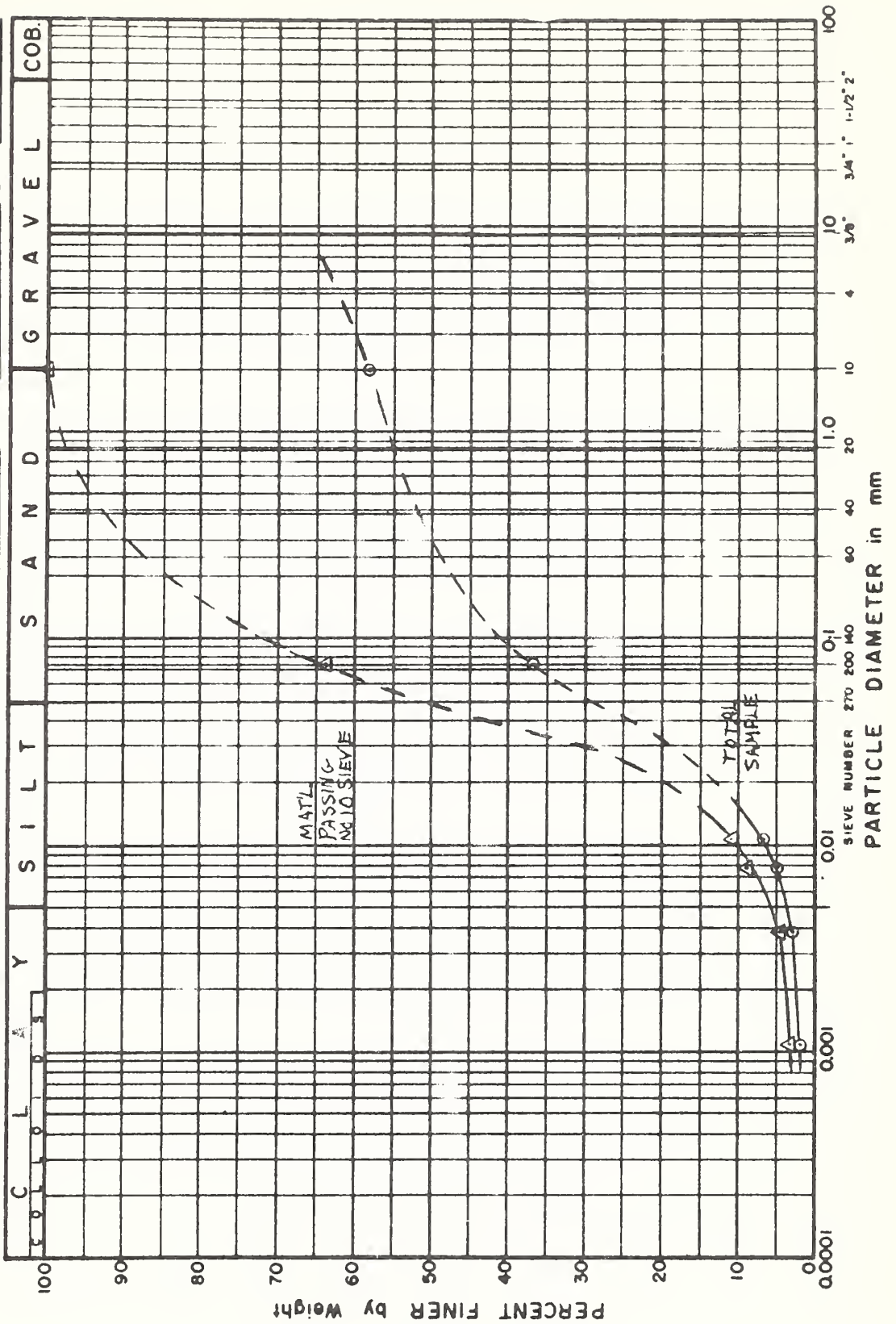
\*Poorly crystalline random-mixed-layer (betonitic) clay.





# MECHANICAL ANALYSIS OF SOILS GRAIN SIZE DISTRIBUTION CURVE

Sample No. 2 Boring        Depth        Textural Classification        Name J. Pest Date 16 DEC. 74





Name J. Post Date 6/2/57





APPENDIX B





## CERAMIC GROUPS

"Group IV:    A.D. 1067-1130    DOMINANT:   Black Mesa Black-on-white  
Sosi Black-on-white  
Dogoszhi Black-on-white  
Holbrook Black-on-white  
Tusayan Corrugated  
Angell Brown  
Winona Brown  
Sunset Red (& Sunset Brown?)  
Tusayan Black-on-red

PRESENT:      Flagstaff Black-on-white  
                 (rare-late Group IV)  
         Walnut Black-on-white  
                 (rare-late Group IV)  
         Coconino Red-on-buff  
         Winona Red-on-buff  
         Winona Red  
         Winona Smudged  
         Winona Corrugated  
         Moenkopi Corrugated  
         Rio de Flag Brown (early  
                 Group IV)  
         Youngs Brown  
         Turkey Hill Red (rare -  
                 late Group IV)  
         Medicine Black-on-red  
         Citadel Polychrome

Group V: A.D. 1130 - 1210      DOMINANT:    Flagstaff Black-on-white  
Walnut Black-on-white  
Sosi Black-on-white  
Dogoszhi Black-on-white  
Tusayan Corrugated  
Moenkopi Corrugated  
Winona Brown  
Sunset Brown  
Sunset Red  
Tusayan Black-on-red

PRESENT:    Wupatki (Tusayan) Black-on  
              white (late Group V)  
Angell Brown  
Youngs Brown  
Turkey Hill Red  
Citadel Polychrome  
Tusayan Polychrome



Group VI: A.D. 1210 - 1300 DOMINANT: Wupatki (Tusayan) Black-on-white  
Flagstaff Black-on-white  
Walnut Black-on-white  
Leupp Black-on-white  
Tusayan Corrugated  
Moenkopi Corrugated  
Sunset Red

PRESENT: Polacca Black-on-white  
Kiet Siel Gray  
Winona Brown?  
Turkey Hill Red  
Tusayan Black-on-red  
Citadel Polychrome  
Tusayan Polychrome  
Kiet Siel Polychrome  
Kayenta Polychrome  
Kintiel Black-on-orange  
and Kintiel Polychrome  
St. Johns Polychrome

No post - A.D. 1300 ceramic group defined for the Flagstaff area.  
Possible post-A.D. 1300 occupations at NA 72, NA 414, NA 863."

(Wilson 1969:TABLE 20, following p.360)





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